Queensland.

DEPARTMENT OF MINES.

GEOLOGICAL SURVEY REPORT,
No. 184.

GOLD WORKINGS IN THE PERRY SCRUB,
BURNETT DISTRICT.

By LIONEL C. BALL, B.E.,
ASSISTANT GOVERNMENT GEOLOGIST.

BRISBANE:
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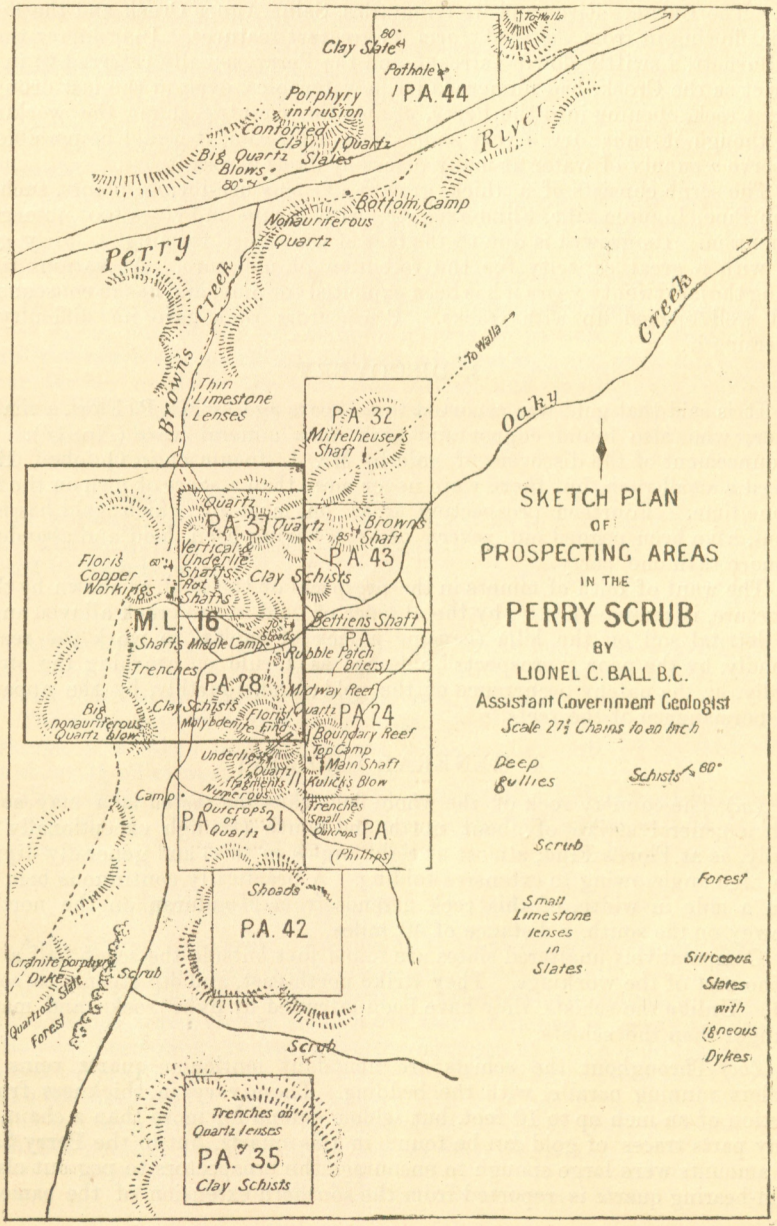
1. LOCALITY.

The Perry (Good-night or Tenningering) Scrub extends in the form of a narrow belt from Saint Agnes Creek, on the north, to the Burnett River west of Paradise, on the south, crossing the Perry River about 6 miles above its junction with the Burnett. The workings are in about the centre of the scrub, and are all within 2 miles of the Perry. (*See* plan.) The distance by road



to Gin Gin is 18 miles, to Childers 29 miles, and to Mount Perry about 30 miles. The last, besides being the longest, is by far the roughest, and is very seldom used. Timber-getters' tracks are followed from the scrub to Walla on the Burnett, where the Gin Gin and Childers roads diverge; thence the road from Walla to Gin Gin is mostly flat and in very good condition, while that to Childers is both hilly and sandy, so that Gin Gin is the only practicable outlet for the field.

2. TOPOGRAPHY.

The scrub country is broken, owing to numerous long and steep ridges; but the surface in the neighbourhood shows no great relief, the greatest difference in elevation between creeks and hilltops being less than 100 feet. The Burnett River and its tributaries, Saint Agnes Creek and the Perry River, flowing in from the west, form its greatest features. In ordinary times, the Burnett, a swiftly-flowing stream, and the Perry, usually referred to in the district as the Creek, had numerous large waterholes, even in the last drought. Oaky Creek, opening into the Perry, drains the country about the workings, and, though it runs dry a very short time after rain, it would be possible to conserve a supply of water at many places by dams across it.

The scrub consists of a thick growth of moisture-loving plants, such as Hoop Pine, Lignum vitæ, Flindersia, &c., with shrubs and vines too numerous to mention. Its growth is due to the fact of the schist forming a fairly good soil, with a great capacity for the retention of moisture. At various times during the last twenty years it has been exploited for pine, and has in consequence been well opened up with tracks. Prospectors thus have no difficulty in traversing it.

3. DISCOVERY.

It is said that gold was reported three years ago by Mr. P. Flori, a timber-getter, who also found copper and took up a mineral lease (No. 16). The announcement of the discovery of gold by Mr. J. Jocumsen in October, 1902, caused a small rush, but there were never more than a score of men on the field at one time. Fourteen prospecting areas, on most of which gold has been found, have been pegged out, several of them having been held and abandoned by more than one party.

The want of faith of miners in the prospects of the field, as shown by their departure, is caused—firstly, by the absence of gold in the creek alluvial and in the detrital soil on the hills (causing a lack of capital to work the reefs); secondly, by the poor "prospects" obtained as a rule on crushing the stone; thirdly, by the patchy occurrence of the gold; and, fourthly, by the apparent non-permanence of the reefs.

4. GENERAL GEOLOGY.

(*a.*) The country rock of the whole field thus far tested is a clay schist, with a general strike of about north and south (though exceptionally and locally, as at Flori's Find, almost at right angles to this) and generally dipping at a high angle owing to extensive folding. A practically continuous belt, less than a mile in width, of this rock extends from Monduran on the north to Chowey on the south, a distance of 40 miles.

Comparatively unaltered slates are found just outside the scrub half a mile to the east of the workings. They strike north-east, and dip steeply to south-east. Unlike the schists, they have been intruded by dyke rocks and may be younger than the schists.

(*b.*) Throughout the schists are abundant lenticular quartz veins and veinlets running parallel with the bedding. These vary in thickness from a fraction of an inch up to 10 feet, but seldom extend for more than a chain. In many parts traces of gold can be found in this quartz, but in the Perry Scrub the amounts were large enough to encourage the prospectors to peg out claims. Gold-bearing quartz is reported from the southern extension of the same belt also.

The schists have most probably originally been ocean sediments, and altered by pressure and heat from shale and slate into schist; most of the quartz separating out during the latter processes of metamorphism to form what are known as segregated or segregation lenses. It must be mentioned, in parenthesis, that doubt has lately been thrown on the segregation theory,* some believing that the bodies represent original fissure-veins broken up and squeezed into isolated lenses by earth pressure. If such were the origin, one would expect to be able to always pick the quartz up again on further driving and sinking.

The reefs are characterised by the massive character of the quartz and its general barrenness of metallic minerals, by the shortness of the outcrops and their relative great width, and by their lying with their longer axes parallel to the foliation of the country rock.

Such segregation deposits are typically not permanent in depth, and have usually no greater vertical than longitudinal extent. Pyrite was observed in small quantities in a few of the workings, and in one outcrop small scales and bunches of molybdenite were found. The gold seldom or never occurs throughout the deposits, being either in shoots, in bunches, or else in zones on one of the walls, so that, though the reef may be many feet wide, only a few inches are auriferous.

The quartz veins in the Brisbane schists belong to this category, but differ from those in the Perry Scrub in being much thinner, though somewhat more permanent and in greater numbers. Reports of the finding of colours and isolated grains of gold from these have often been published.

(*c.*) Limestone occurs in the schist in relatively small amounts. it and quartz in any part of the belt being in inverse proportion. It occurs in small quantities north and south-east of the main workings, and other larger deposits occur farther north in the Gin Gin district and south near Tenningering Station. The origin of part of the limestone has probably been similar to that of the quartz, for no trace of fossils could be found at the localities examined. (The Tenningering limestones were not examined.)

(*d.*) Granite occurs on the left side of the Perry River, about a mile west of the workings, but no evidence was obtained as to whether it is intrusive or not. The auriferous character of the quartz in this locality may have been caused by its intrusion.

5. WORKINGS.

At the time of my visit, 14 prospecting areas had been pegged out (*see* plan)—one on the north side of the Perry River, the others across the river, east and south of an abandoned mineral lease (No. 16).

The south-eastern corner of the lease, which is in about the centre of the workings, was taken as datum point; it lies a mile south of the Perry River and about 3½ miles west of the Burnett.

Three of the areas appear to have been abandoned, and a fourth has only just been pegged out. There were only 8 men on the field, and most work was being done on prospecting areas 24, 31, and 43.

(*a*) Prospecting Area No. 24 (known as the P.C.).

Area, 400 by 400 yards. Adjoins M.L. 16 at the south-eastern corner.

Two reefs have been prospected—one 2 chains south-east of the corner peg of M.L. 16, the other within 2 yards of the western boundary of the area. On the former, which strikes about north and south and is nearly vertical, two shafts have been sunk, 24 feet apart, the northern of which is 40 feet deep. It was accessible to 26 feet only, at which level is a drive connecting with the bottom of the southern shaft. Above the level the reef has been stoped out. The ground has been trenched for 1½ chains south of main shaft and also to the north, but nothing beyond thin leaders has been discovered.

* Kemp's "Ore Deposits of the United States and Canada."

The prospectors informed me that the width of quartz stoped varied up to 18 inches, and that at 40 feet depth the reef gave way to "formation" carrying a little gold. The reef cut out within a few feet of the shaft on the northern end, but was followed to the south for 35 feet before pinching. The only quartz (bunches up to 9 inches across and 1 foot in length) now to be seen in the workings is underfoot in the drive between the shafts.

The gold is said to have been confined to no particular part of the quartz—a most unusual thing in this locality. The returns from the quartz raised are:—

	Tons.		Oz.	dwt.	gr.
February, 1903	5½	for	7	14	12
April, 1903	10	„	15	10	0
June, 1903	6	„	12	0	18
	21½	„	35	5	6

An average of over 1½ oz. per ton.

The country on the west is smoothly foliated clay schist, that on the east being rather more contorted and somewhat sandier.

There is no promise of the same reef being found on further sinking, though other independent lenses may, of course, be struck.

The western or boundary reef runs parallel to the eastern boundary of M.L. 16, and dips near the surface at an angle of 70 degrees to the west. It has been trenched for 100 yards to a depth of 10 feet, and potholes have been opened and specimens picked up for over a distance of 3 chains. Traces of galena and pyrite have been found in the quartz here.

Below is a sketch of the exposure in the centre of the trench, looking south—

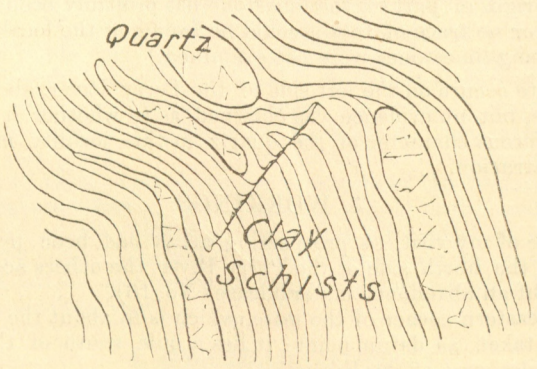


Fig. 1.

SEGREGATION VEINS.

Scale, $\frac{1}{20}$th.

A sample was taken from the few tons of ore at grass. Crushed and washed at the office, it gave a small prospect of very fine gold. Assayed by the Government Analyst, it yielded:

Gold = 3 dwt. 19 gr.; silver = 1 dwt. per ton.

In January last 3 tons of stone from this trench and from "shoads" to the south yielded 16 dwt. per ton. The country rock is clay slate showing much folding and puckering. Stringers of quartz in the hanging-wall country adjacent to the reef carry gold in places.

About 3 chains east of the main line auriferous specimens have been found and traced for 8 chains to the north, where is an opening on a 12 to 18 inch reef carrying pyrite, but no free gold. Colours of gold have also been found in the centre of the northern boundary.

(*b*) Prospecting Area 28.

Area, 400 by 400 yards. Situated in south-eastern corner of M.L. 16.

The main workings are on the hilltop, in the south-eastern corner, where there is a large outcrop known as Flori's Find, caused by the development of four parallel quartz bodies, within a distance of a few yards of one another. A trench (8 feet in greatest depth) has been cut across them from the west-north-west, and shows that they strike with the clay-schist country (here about north-east), and dip 1 in 10 to the north-west. The western reef is 6 feet thick. Near the trench it stands 2 feet above the ground, and it can be traced by fragments on the surface for 2 chains to the north-east and for possibly 4 chains to the west-south-west. The thickness decreases rapidly southwards; but the number of parallel veinlets increases at the same time. Fragments of quartz are strewn over the ground for over 5 chains to the south-west, but they probably form separate bunches in the schists.

The quartz is massive and generally white, but some of it weathers pink and has ironstained cracks throughout it. The best gold is said to have been found in the central part of the reef. A sample was taken from the trench and for 2 chains to the south. The result of analysis is:

Gold = 9 dwt. 9 gr.; silver = 5 dwt. 8 gr. per ton.

Another sample from the cut only gave:

Gold = trace; silver = trace.

The next blow to the east is separated from the above by 25 feet of schists (quartz-veined in part). It is 2 feet thick, and can be traced by fragments on the surface for half a chain to the south. A sample from the trench yielded:

Gold = 4 dwt.; silver = 2 dwt. 16 gr. per ton.

Then, 3 feet beyond this is another reef 18 inches thick, a sample from which yielded:

Gold = 1 dwt. 8 gr.; silver = 1 dwt. 8 gr. per ton.

The prospectors refer to the two last-described reefs as the "eastern," and have found them to carry much better gold than the big western reef. No work has been done on them outside the trench, and it is doubtful if they continue more than a few feet.

A shallow pothole has been sunk on a fourth reef (known as the "iron lode"), about 10 feet east of the above. The quartz is strongly stained with oxide of iron, and has yielded the prospectors the best prospects of all. The reef—2 feet thick—has been exposed by a trench for several feet, and a pothole 2 yards to the south, sunk on loose blocks, cut the reef at 9 feet depth, but it was then abandoned.

A parcel of 10 tons of stone was being sent away for a trial crushing at the time of my visit, but the returns have not yet been received.

Molybdenite occurs to the extent of, perhaps, one-half of 1 per cent. in surface quartz, containing gold and pyrite, a few yards to the south of the big outcrop. The spangles are generally less than $\frac{1}{8}$-inch in diameter. On account of the small amount it is not very promising, but, as molybdenite sometimes increases in depth, it would be worth prospecting.

There are numerous outcrops on this area. The first, north of Flori's Find, is known as the Midway Reef. Here quartz fragments occur, distributed over an area 2 chains across, and traceable for 2 chains further to the north. Trenches and potholes about 1 chain apart only expose quartz lenses 6 to 12 inches long, forming a belt 2 to 3 feet wide in the clay schist, here striking north-north-east and almost vertical. Some of the quartz carries coarse pyrite, and the gold—good prospects of which can be washed from parts of the quartz—is said to be very patchy. A sample from the whole of the exposure yields:

Gold = 9 dwt. 23 gr.; silver = 4 dwt. 22 gr. per ton.

The whole surface over an area 3 by 2 chains on the south side of Oaky Creek is covered with white and pinkish quartz fragments, from the more strongly coloured ones of which good prospects of fine reddish gold can be dollied. This quartz has probably been shed by a great number of leaders in the schists. A sample from here yields :

Gold = 1 dwt. 8 gr.; silver = 16 gr. per ton.

Gold-bearing "shoads" are plentiful north of Oaky Creek, in the north-eastern corner of the area, and Bettien's shaft has been sunk 18 feet on a leader 3 inches thick at the surface, but averaging 9 inches below. The strike is a little east of north, and the general dip is the same as the clay-slate country. It cut out on the north end of the shaft. The stone obtained (2½ tons) was mixed for crushing with 5 tons from P.A. 32, so that it is not known what it may have contained.

A sample from the shaft yields :

Gold = 8 dwt.; silver = 2 dwt. per ton.

(*c*) Prospecting Area 31 (Glenister's).

Area, 400 by 400 yards. Adjoins P.A. 28 on the south. Two chains south-west of Flori's Find an underlie has been opened on a 4-inch segregation leader, dipping 70 degrees to the north-west. At the bottom, 27 feet from the surface, the quartz has increased to 2 feet 7 inches in thickness at one end, but at the other it is mixed with country rock (clay slate). The best gold is said to have been on the hanging-wall; 9 tons 5 cwt. of quartz from the shaft yielded at Gympie (without the concentrates) :

Gold = 7 dwt.; silver = 1 oz. per ton;

but much higher assays have been obtained. A sample taken from near the bottom of the shaft yielded :

Gold = 3 dwt. 8 gr.; silver = 1 dwt. 8 gr. per ton.

Fifteen yards south-west of the underlie is a windlass-hole 10 feet deep on a segregation quartz zone, 12 to 18 inches wide, the stone from which has assayed up to as high as 2 oz. 18 dwt. per ton. Quartz fragments lie on the surface for 30 yards south of this hole, and some leaders have been trenched several chains to the south-west, where they appear to be very numerous. One chain west of the underlie shaft a trench has been cut across a reef, on the line of strike of the eastern vein on Flori's Find.

Kulick's Blow is near the eastern boundary, 4 chains south of the south-eastern corner of M.L. 16. The quartz in the widest part is 2 feet 6 inches thick, but it quickly tapers, and pinches out within 10 feet both north and south. Ten yards to the north it again comes in, and has been trenched for 1 chain. It is vertical, and the general strike is north by east. The main mass of the quartz is white and hungry-looking, with iron stains only on the larger cracks; but on the eastern side is a laminated coating of iron-stained quartz, with a mammilated surface. The walls are unusually well defined, but the evidence, on the whole, points to its being a segregation vein. A sample from this outcrop and about 3 tons of ore at grass was dollied and washed in the office, but did not yield any gold. The country rock is yellowish-brown clay slate.

The quartz worked on this area probably belongs to different lenses to those on P.A. 28.

(*d*) Prospecting Area 35 (Southern Extended).

Area, 400 by 400 yards. Workings lie about three-quarter mile south of Flori's Find.

Numerous trenches have been made on lenticular bunches of quartz in clay-slates striking north and south and dipping 80 degrees to the west. On the east a trench 15 yards long exposes bunches of quartz up to 18 inches

thick. These are said to have carried gold near the hanging-wall. Two yards west of northern end of this, a separate lens, 18 inches, has been exposed, and 3 yards west of the southern end a line of lenses up to 12 inches thick have been exploited by potholes and trenches. The more auriferous portion of the latter line—a shoot about 1 foot in diameter, which contributed most of the gold to the crushing given below—has been removed. The quartz now remaining in the larger bunches is slightly "mineralised" (pyritous), but does not carry payable gold, though the miners found the schist at the ends of the lenses to sometimes contain a little gold.

A crushing, in May last, of 4 tons of stone from these trenches yielded 4 oz. per ton.

A sample from all the exposures yields:

Gold = 1 dwt. 8 gr.; silver = 2 dwt. per ton.

A surface sample was taken from an outcrop of white quartz on the southern side of Oaky Creek, about half a mile south-south-west of P.A 35. The area covered is 1 chain in length and 20 feet in width, and fragments have been picked up for a quarter of a mile to the south. The sample crushed and dollied yielded only the faintest possible trace of gold.

(*e*) Prospecting Area 43 ("Childers Retreat").

Area, 400 by 400 yards. Adjoins M.L. 16 on the eastern side, and separated by a few chains from P.A. 24.

A shaft in the northern portion of the area was begun on 2 feet of quartz, but below the subsoil two separate leaders were found, decreasing in thickness and at 10 feet depth apparently cutting out.

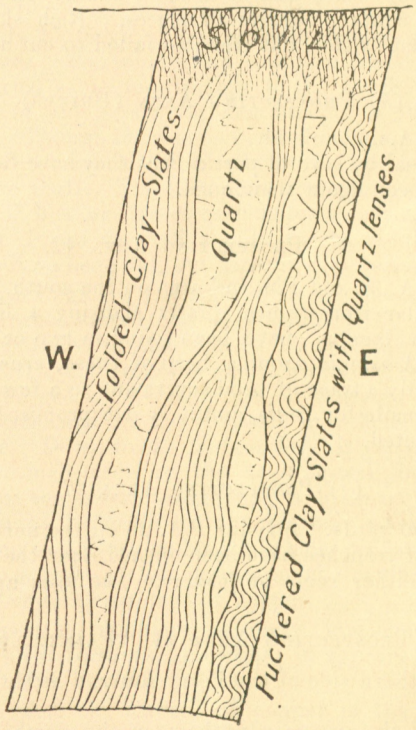


Fig. 2.

Segregation Veins, North End of Shaft.

Scale, 32 feet to an inch.

The strike is N.N.E., and the dip is very steep to the west. The quartz is rather iron-stained, and the darker parts carry pyrites as well as fine gold. A shallow hole 10 yards to the north exposes 6 inches of quartz, and trenches to the south expose only thin leaders. About 5 tons of ore have lately been sent to Aldershot, but returns are not yet available. A sample from the shaft and ore paddock dollied a very fair prospect of gold and assayed:

Gold = 3 dwt. 8 gr.; silver = 1 dwt. 8 gr. per ton.

The clay-schist country on the eastern side of the lode is minutely contorted, but that on the west is broadly folded parallel to the swellings of the quartz; south of the shaft are dark bands strongly impregnated with pyrites.

(*f*) Prospecting Area 32.

Area, 400 by 400 yards. Adjoins P.A. 43 on the north.

The workings are in the centre of the area within a couple of chains of the Walla road. A shaft has been sunk 25 feet on a vertical zone of 6-inch quartz lenses striking north-north-east. Five tons were raised, but were crushed with 2½ tons of stone from P.A. 28, so that the yield of 10 dwt. per ton gives little idea of the contents.

Another outcrop 10 yards south-west of the shaft was opened to a depth of 3 feet. The quartz looks promising, but it occurs in lenses only.

(*g*) Prospecting Area (Phillips).

Adjoins P.A. 24 on the south.

Small outcrops of white quartz about 5 chains south of the P.C. shaft have been found to contain colours in places. Rich shoads were found by prospectors to the east of this, but trenches failed to cut a reef.

(*h*) Prospecting Area (Briers).

Lies between P.A.s 43 and 24.

This has been held by several parties, but they have failed to find any reef, and the ground has been again abandoned.

(*i*) Prospecting Area 42.

Adjoins both P.A. 31 and Phillips' area on the south.

Shoads of cellular iron-stained quartz showing a little free gold and pyrite, especially on laminæ, have been found in two or three places in the northern portion. A sample from a heap of these, crushed and washed in this office, yielded only a trace of gold equivalent to a few grains per ton. No search has yet been made for reefs, and it is not proposed to begin work till a battery has been erected.

(*j*) Prospecting Area 37.

Area, 400 by 400 yards. Adjoins P.A. 28 on the north.

Several chains of trenches have been opened near the southern boundary, but without finding either reefs or leaders. The area appears to have been abandoned.

(*k*) Prospecting Area 44 ("Painkiller").

Lies on the northern side of the Perry River, a little over 1 mile north of the P.C.

In the centre of the area is a pothole on the northern end of a body of quartz, 9 inches in greatest thickness, only one block of which outcropped on the surface. The strike is north by west, and the dip is 85 degrees to the east. The reef is believed to carry gold, except in the milk white portions.

A sample from the ore exposed yields:

Gold = 4 dwt.; silver = 16 gr. per ton.

Other outcrops have been seen to the north, but they have not yet been prospected.

An 18-inch reef is exposed for half a chain in the bed of a creek near the river, 5 chains west of the area. The strike (local) is east-north-east owing to a fold in the contorted clay-slate country. Other reefs outcrop on and near the river bank, about 10 chains above this. At the latter 3 to 4 feet of quartz have been laid bare for a length of 10 feet, the reef apparently dipping 80 degrees to the north-west. A sample from this assayed:

Gold = trace; silver = trace.

Specimens dollied and washed showed only traces of gold.

(*l*) Prospecting Area. (?)

Lies south of P.A. 42. This area has just been pegged out, but no work has yet been done on it.

(*m*) Mineral Lease No. 16.

Area, 160 acres. Position, a little over half a mile south of the Perry River.

The workings are in about the centre of the lease, near the timber road, connecting with Walla, which is now the main track for the ore wagons.

The southern workings lie 1 chain south of the track. The top shaft, sunk at the beginning of the year, is 20 feet deep; the middle, 5 yards to the south-south-west, 30 feet deep; and the third, 10 yards beyond, 35 feet deep (but now open to only 25 feet). These are all inaccessible, owing to absence of ladder and windlass. The middle and southern shafts were connected by a drive which was carried some feet further to the south. In the ends of the lower shafts 2 feet of red gossan, dipping steeply to the west, can be seen with a good footwall. Though there is no defined hanging-wall, there are several inches of decomposed white schist, into which the ore is said to have changed at the bottom of the shaft. The only traces of ore now to be seen on the tips are thin crusts of blue and green carbonates on the schists. Slight traces of copper have been found for half a mile to the south, and a considerable number of trenches have been cut, but without discovering any lodes.

The northern workings are 2 chains north of the track, on a gossan lode dipping, with the drab-coloured clay-slate country, 60 degrees to the west. An underlie shaft has followed the lode to 20 feet depth; then a drive was run 20 feet to the north, and from the end a winze 40 feet deep connects with a vertical shaft. The gossan seems to be on a fissure which is well defined centrally in some places and on the footwall in others, but seems sometimes to die out altogether. Down to the 20-feet level it varies from 9 to 15 inches in thickness, with a 3-inch leader on the hanging-wall, but it then disappears. At a depth of 35 feet the gossan (containing a little copper carbonate) again comes in, and averages 18 inches to the bottom, where there are several irregular chambers up to 15 feet in length, which probably represent bunches of ore removed. A sample of the gossan in the underlie was taken, but it contains only a very small percentage of copper.

The country rock is clay-slate, strongly impregnated with brownish manganese dioxide in the form of dendritics; it appears on the hanging-wall to have been subjected to leaching.

It is rumoured that the amount of copper in the ore taken from the underlie shaft yielded a large profit. Under these circumstances it would be well worth driving from the underlie shaft, and then sinking, as the gossan seems to be on a fissure.

6. CONCLUSIONS.

While the reefs inspected give no promise of permanence, there is always a possibility that permanent reefs (fissure veins, crush zones, or replacement zones) may be discovered in the district, and the fact that the segregated quartz carries good values in places would augur well for the future of such if discovered.

The large amount of quartz on the surface has given rise to the idea that a small battery erected in the neighbourhood might prove a remunerative investment. If all the quartz in sight carried even 10 dwt., there would be little doubt about it, for there is a splendid water supply in the Perry River, and stone could be carted from all over the scrub at a cheap rate, owing to the numerous timber tracks intersecting it. Unfortunately, it is only a small portion of the quartz that would carry even 10 dwt.

As an example of the difficulties under which prospectors labour here, it may be mentioned that they pay 25s. per ton for carting to Gin Gin, 12s. per ton railage to Aldershot (after the first free trial parcel of 5 tons), and then 8s. carting and crushing at Aldershot—a total of £2 5s. per ton without including assay and sampling charges—leaving little out of £3 12s., the value of the gold per ounce, for mining and profit.

My acknowledgments are due to Mr. George Martin, M.L.A., for aid in getting to the field, and to the miners on the field, who rendered every possible assistance.*

LIONEL C. BALL,
Assistant Government Geologist.

25th July, 1903.

*Allowance must be made for any discrepancies between the report and the assays, as this had to be written before the assays were available.

By Authority: GEORGE ARTHUR VAUGHAN, Government Printer, William street, Brisbane.